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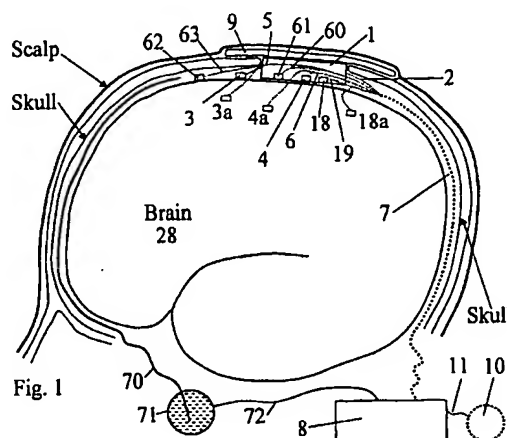
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[Continued on next page]

(54) Title: **TECHNIQUES USING HEAT FLOW MANAGEMENT, STIMULATION, AND SIGNAL ANALYSIS TO TREAT MEDICAL DISORDERS**



(57) Abstract: A device and method of use for treating a medical disorder by surgically implanting into a patient at least one sensor element (4) capable of detecting and conveying cell signals; attaching a management unit (8) such that a micro controller (22) of the management unit (8) is connected to at least one sensor element (4); and connecting the management unit (8) via a lead bundle (7) to at least one treatment device (71). The treatment device may be an electrical stimulation device (27), a magnetic stimulation device, a heat transfer device (9), or a medication delivery device (71). Responsive to signals from the one or more sensor elements, mathematical algorithms of the management unit use wavelet crosscorrelation analysis to prompt delivery of at least one treatment modality, such as heat transfer, current pulses, magnetic stimulation or medication. The medical disorder may arise from the brain, central nervous system or organs and tissues outside of the central nervous system.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/28814

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61N 1/18
US CL : 607/ 3 and 607/116

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 607/ 3, 4, 39, 40, 42, 45, 46, 53, 54, 59, 60, 62, 63, 67, 72, 96, 115, 116, 117, 120; and 128/898

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,134,474 A (FISCHELL ET AL.) 17 October 2000, figure 1, claim 19, and column 2, lines 41-62; column 3, lines 38-65; column 7, lines 23-29; column 8, lines 28-38 and 53-56; column 11, line 18 - column 12, line 40; column 20 lines 45-51; column 22, lines 44-63; column 30, lines 17-44; column 32, lines 42-55.	1-14,16-20,24-31
P,Y	US 6128537 A (RISE) 3 October 2000, figures 3 and 8, table 3, and column 1, lines 6-11; column 3, lines 13-42; column 4, line 1-3, 18-20 and 34-49; column 5, lines 59-64; column 7, line 63 - column 8, line 10; column 8 line 52 - column 12, line 2.	1-14,16-19,32-33
Y	US 5913882 A (KING) 22 June 1999, figure 1 and column 1 lines 46-48; column 2 lines 19-65; column 3, lines 16-26; column 4, lines 59-65; column 5, line 32 - column 6, line 17.	1,2,4-14,16,32-33
Y	US 5683422 A (RISE) 4 November 1997, figure 1 and column 1, line 24 - column 4, line 14.	1,2,4,5,8-13,16,19,26-28, 32
Y	US 5849031A (MARTINEZ ET AL.) 15 December 1998, figure 3, claims 20, 21 & 24, and column 2, lines 37-61; column 5, lines 50-65; column 7, lines 17-35.	20
Y	US 5626627 A (KRYSTAL ET AL.) 6 May 1997, column 13, line 66 - column 14, line 7.	15
Y	US 4945910 A (BUDYKO ET AL.) 7 August 1990, claims 4 and 6.	20-23

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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INTERNATIONAL SEARCH REPORT

Inter. application No.

PCT/US00/28814

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/28814

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING:

- I. Claims 1-18 and 32-34, drawn to a general apparatus and method to treat a medical disorder, classified in class 607, subclass 3, and
- II. Claims 19-31, drawn to a method to treat a brain disorder, classified in class 607, subclass 116.

The inventions are distinct from each other because: Inventions I. and II. are related as a combination and subcombination. The inventions are separately usable. Because the inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classifications, restriction for examination purposes as indicated is proper.